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HYGIENIC AND SANITARY PRACTICES OF VENDORS OF STREET FOODS IN NAIROBI, KENYA.

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ABSTRACT

The street food industry has an important role in the cities and towns of many developing countries in meeting the food demands of the urban dwellers. It feeds millions of people daily with a wide variety of foods that are relatively cheap and easily accessible. Street food sector symbolizes the street life in Africa and it operates in an unstable and precarious state because the sector lacks legal recognition. There have been noticeable increases of food vendors in Nairobi, who sell both raw and cooked food items. There are not regulated, they operate haphazardly without any monitoring of what they prepare and how they do it. A study to determine hygienic and sanitary practices of vendors of street foods in Nairobi was carried out using a descriptive survey design. A sample size of 80 street food vendors selling commonly consumed foods was selected. Data was collected using in-depth interview schedules and observation checklists. Information from the study shows that vendors lacked training on food preparation. About 62% obtained food preparation skills through observation while 33% were taught by their parents in non-formal settings. The preparation surfaces used for the preparation of raw foods were not washed regularly. Cooked foods were stored at ambient temperature in cupboards, plastic bowls, jugs and buckets were just left in the open uncovered. Eighty-five per cent of the vendors had garbage and waste bins beside the food stalls. Personal hygiene was not also observed, as the vendors never covered their heads, handled money and food at the same time and they did not wear overcoats/aprons and handled food with bare hand. Street food vendors were not aware of hygienic and sanitary practice. The food is sold to unsuspecting clients who are likely to get food-borne diseases. This study recommends the establishment of street food centres by the city council, the training of street food vendors on hygiene, sanitation and the establishment of code of practice for the street food industry and the empowerment of Public Health Officers.

Key words. Street foods, hygiene and sanitation.

FRENCH

RÉSUMÉ

L'industrie des aliments de rue a un rôle important dans les cités et villes de plusieurs pays en développement en vue de satisfaire les demandes en aliments des habitants des villes. Elle nourrit des millions de personnes chaque jour avec une grande variété d'aliments qui sont relativement bon marché et facilement accessibles. Le secteur des aliments de rue symbolise la vie de la rue en Afrique et il fonctionne dans un état instable et précaire parce que ce secteur n'est pas reconnu légalement. Le nombre de vendeurs d'aliments s'est multiplié à Nairobi d'une manière remarquable; ils vendent des denrées alimentaires crues et cuites. Ce secteur n'est pas réglementé; les vendeurs travaillent en désordre sans que personne ne contrôle ce qu'ils préparent et comment

ils le font. Une étude visant à déterminer des pratiques hygiéniques et sanitaires des vendeurs d'aliments de rue à Nairobi a été menée en utilisant un modèle de recherche descriptif. Un échantillon d'une taille de 80 vendeurs d'aliments de rue vendant des aliments communément consommés a été sélectionné. Des données ont été collectées en utilisant des plans d'interview très détaillés ainsi que des listes de contrôle et d'observation. Les informations provenant de cette étude montrent que les vendeurs manquent de formation relative à la préparation des aliments. Près de 62% ont acquis des compétences de préparation d'aliments par observation, tandis que 33% ont appris de leurs parents dans des cadres non formels ou non structurés. Les surfaces de préparation utilisées pour la préparation des denrées alimentaires crues n'étaient pas lavées régulièrement. Les aliments cuits étaient conservés à la température ambiante dans des placards, ainsi que dans des bols en plastic, dans des cruches et dans des seaux laissés ouverts en plein air. Quatre-vingt-cinq pour cent de ces vendeurs avaient des ordures et des poubelles à côté des stands des aliments. L'hygiène personnelle n'était pas observée non plus, étant donné que ces vendeurs ne couvraient jamais leurs mains, ils manipulaient de l'argent et la nourriture en même temps, ils ne portaient pas de pardessus/tabliers et ils touchaient les aliments avec les mains nues. Les vendeurs d'aliments de rue n'étaient au courant d'aucune pratique hygiénique et sanitaire. Les aliments sont vendus à des clients non avertis qui sont susceptibles d'attraper des maladies d'origine alimentaire. Cette étude recommande que la Mairie crée des centres de vente d'aliments de rue, que les vendeurs d'aliments de rue soient formés en matière d'hygiène et d'installations sanitaires et qu'un code de pratique soit mis au point pour réglementer l'industrie relative aux aliments de rue et que les agents de la santé publique soient responsabilisés en la matière.

Mots-clés: Aliments de rue, hygiène, installations sanitaires.

INTRODUCTION

The street food industry plays an important role in developing countries in meeting the food demands of the urban dwellers. Street foods feed millions of people daily with a wide variety of foods that are relatively cheap and easily accessible. The street food industry offers a significant amount of employment, often to persons with little education and training [1]. FAO reports that street foods have significant nutritional implications (nutritionally balanced diets, sufficient in quantity and presenting options for variety and choice) for consumers, particularly from middle and low-income sectors of the population who depend heavily on them [2]. Mwangi [3] asserts that, street food in Nairobi provides a substantial amount of income for most vendors, with most of them earning an income above the official minimum wage while some of them earn twice or more of this amount. Although the contribution to the daily food intake of poor urban dwellers is not quantified in energy and nutrients, street foods are important in the diet of the urban poor[4].

According to studies done in Africa on street foods, their tremendous unlimited and unregulated growth has placed a severe strain on city resources, such as water, sewage systems and interference with the city plans through congestion and littering adversely affecting daily life [5,6]. FAO further stipulates that street foods raise concern with respect to their potential for serious food poisoning outbreaks due to improper use of additives, the presence of adulterants and environmental contaminants and improper food handling practices amongst street food vendors [7]. Street food vendors are often unlicensed, untrained in food hygiene and sanitation, and work under crude unsanitary conditions [8].

There is a noticeable increase of food vendors in Kenya. This is clearly evident in Nairobi, where they sell both raw and cooked food items along the streets of Nairobi. It has been instigated by rapidly growing and changing food demands alongside the need to diversify and/or employ more income sources in the face of declining incomes [3]. Due to this increased demand for food, the present study was carried out to determine the hygienic and sanitary practices of vendors of street foods in Nairobi, Kenya. This paper sought to addresses various aspects of hygienic practices like preparation skills, place of preparation, location of street food vendors, handling, storage, personal hygiene and storage of leftovers.

METHODOLOGY

A descriptive survey design [9] was used to answer questions concerning the current status of food hygiene and sanitation practised by vendors of street foods. Hygiene and sanitation were determined by the use of structured interview and through observations. Practices such as acquisition of cooking skills, place of preparation, environmental conditions, methods of washing utensils and preservation methods were studied. Location of the street vendor, utensils used, environment surrounding the street food vendors, general processing of the food and hygienic practices were observed and recorded through an observation checklist.

The target population constituted all street food vendors in Nairobi. The accessible population was all street food vendors in Dandora and Kayole estates. Vendors preparing and selling the commonly consumed foods in the two estates were purposively selected based on a list of street food vendors compiled before the actual data collection. The street foods that are commonly sold in the two estates were *Mutura*, sausages, *githeri*, fish, chips, roasted maize, *mandazi* and fruit salads. Five street food vendors selling each of these foods were purposively selected for the study. The total number of street food vendors included in the study was forty in each estate, giving a total of 80 street food vendors who represented 20% of the total population of street food vendors in the two locations. Data was analysed using the Statistical Package for Social Sciences (SPSS) program as suggested by Robert.[10]. Descriptive statistics such as means and frequencies were used to present the findings. Chi-square was also used to test the relationship between genders, education and some aspects of hygiene. Qualitative data was transcribed to themes and patterns that addressed the objectives of the study. The

observation made were triangulated with the rest of the data for comprehensiveness and complementation.

RESULTS

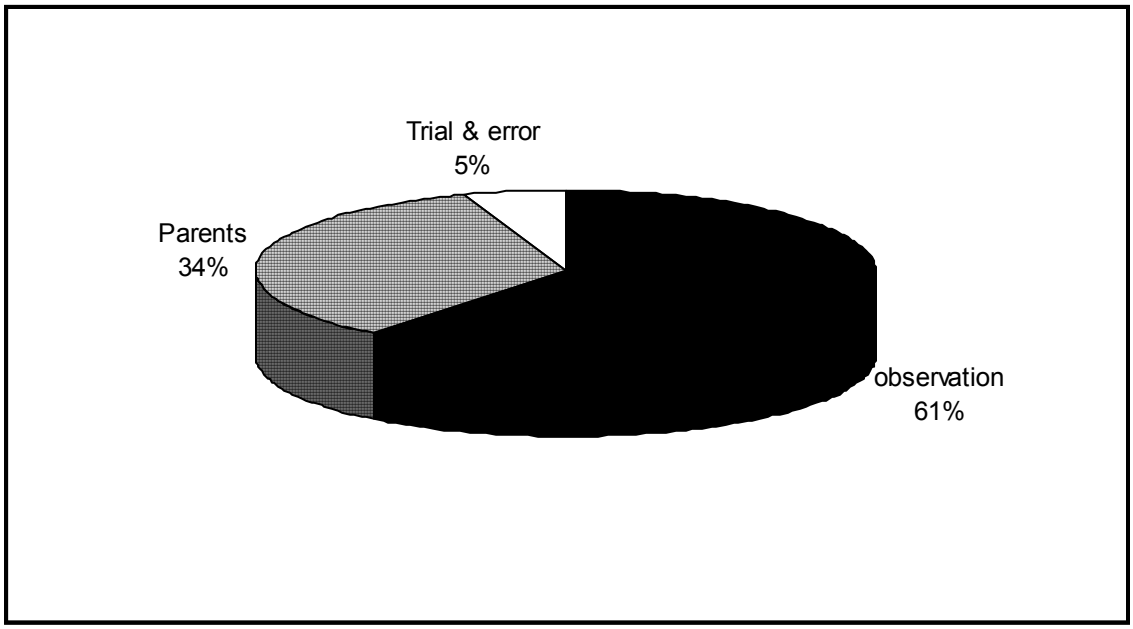
Characteristics of study subjects

Over thirty-five percent of the vendors belonged to the age category of 20-25 years. Sixty percent of the vendors were male while 40% were female, slightly over half of the vendors (57.5%) were married. Sixty-two percent of the vendors interviewed had primary education and below, 36.3% had secondary education while only 1.3% had college education.

Acquisition of knowledge on food preparation

It was important to know how the vendors acquired their cooking skills to establish their knowledge in handling street food. Most (61%) of the vendors acquired cooking skills from observation, 33.3% were taught by their parents while 6.3% gained the skills by trial and error (self taught). Figure 1 shows how vendors in Kayole and Dandora acquired food preparation skills.

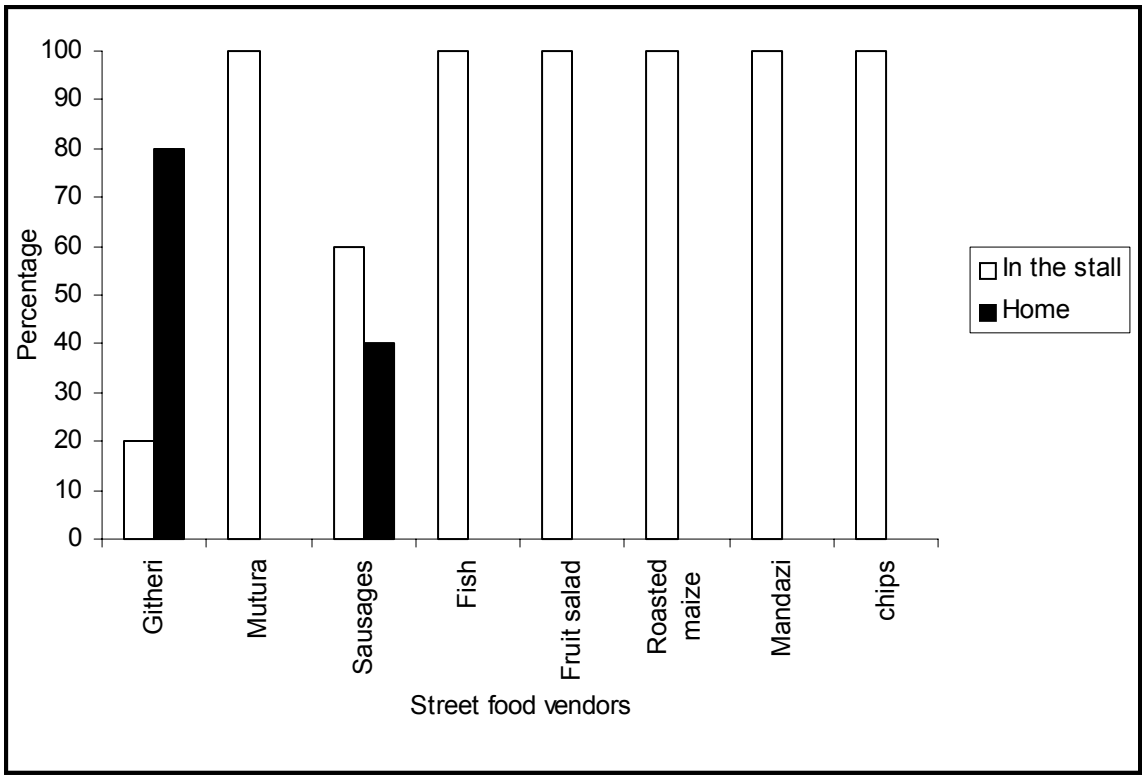
Figure 1. *Acquisition of food preparation skills by street food vendors in Kayole and Dandora estates*



Place of preparation of street foods

Findings show that vendors prepared the foods either at home or at the stalls, which were located by the roadsides. Most of the stalls were made of polythene bags and wood. Vendors selling *mutura, fish,* fruit salad, roasted maize, *mandazi* and chips prepared their foods in the stalls. Sixty percent of the vendors of the sausages prepared them in the stalls while 82% of vendors of *githeri* prepared it at home. The results are shown in Figure 2.

Figure 2:. *Place of food preparation*



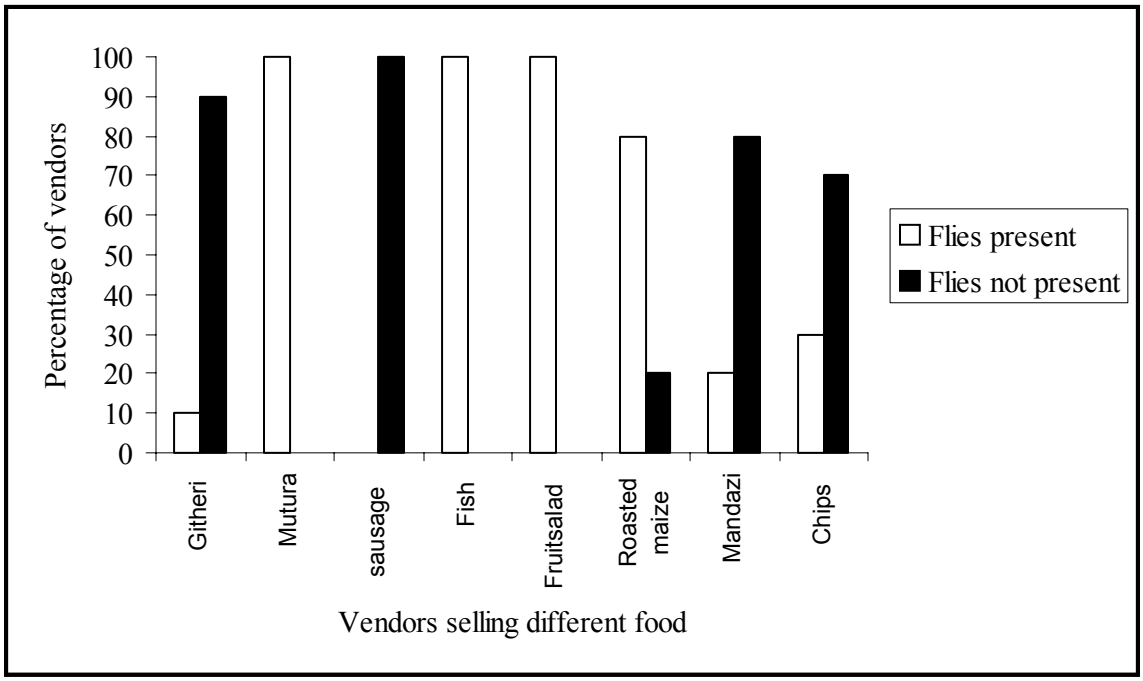
Environmental surrounding of the street food vendors

Based on observation, about 85% of the vendors interviewed prepared their foods in unhygienic conditions given that garbage and dirty waste were conspicuously close to the stalls. Of the vendors interviewed, 92.5% did not have garbage receptacles, hence they disposed their garbage just near the stalls. Ninety-two percent of the vendors threw waste water just beside the stalls making the environment surrounding the eateries quite filthy. A chi square test was done to test the relationship between education and the state of the environment where the street foods were prepared. The results revealed significant p value > 0.05 indicating that there was no significant relationship between education and state of environment. This shows that despite some of the vendors having secondary

education, they had unclean environments just like their counterparts who had primary education. This calls for training in food hygiene for all vendors

It was observed that, houseflies were present in most of the stalls (Figure 3). Flies were present in all stalls selling *Mutura*, fish and fruit salad. With about 80% of vendors of roasted maize, flies were not present. With most of the vendors selling *Mandazi* (80%), chips (70%) and githeri (90%), flies were not present.

Figure 3. Presence of flies on different street foods



Handling of street foods

Hygiene during handling and cooking of street foods was observed. It was found that vendors did not wash fresh foods properly. Vendors who sold fish and chips washed their raw foodstuff only once because they did not have enough water. Vendors selling fruit salads prepared the fruit salads without washing them; they did not have any water to wash their fruits.

It was observed that the preparation surfaces used by the vendors had remains of foods prepared earlier. More than one food types were prepared at the same surfaces and these could promote cross contamination. Observation revealed that the oil used for deep-frying fish, chips, *mandazi* and sausages was re-used more than once. The colour of the oil was dark and the vendors did not replace it with fresh oil. The use of the recycled oil made the *mandazis*, chips, and fish to have an unusual dark colour and unpleasant odour.

Storage of prepared street foods before selling

Cooked foods were kept in different ways before they were sold. Fish vendors placed them openly on their stalls, while chips vendors kept their food in cupboards next to their stalls. Fruit salad was kept in open plastic bowls on the wheelbarrows in which other foodstuffs were carried. Roasted maize was kept at the end of the *jiko* where there was less heat, *mandazis* were kept in the cupboard. Sausages were kept in a *jua kali* made pushing cart and lastly *githeri* was kept in big *sufurias* and placed on *jikos* on low heat. Most of the foods were not covered and were exposed to flies and dust. A chi- square test was performed to test the relationship between gender and how utensils were kept. It was found that there was a significant relationship between gender and how the utensils were kept ($P < 0.05$) about 68% of women vendors covered their utensils compared to 32% of the men, indicating that women are generally more careful in covering their utensils than men.

Results also showed that vendors, after preparing their foods, kept and served them at ambient temperatures. Food was not heated at high temperatures before serving. Food to be eaten raw like fruit salads were not kept under cold temperatures; instead, fruit salad was kept in plastic bowls and it was sold from there.

Water supply

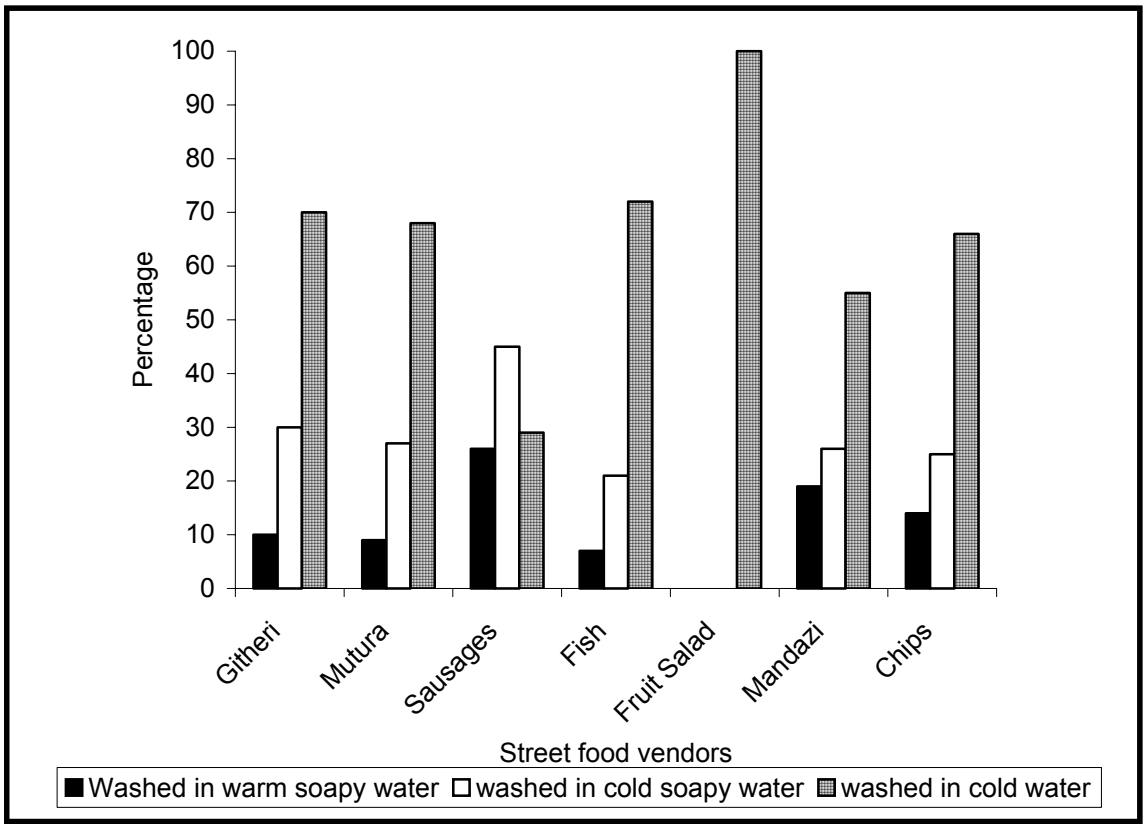
Water was ferried from homes of the street food vendors because no potable water was available at their areas of operation. Vendors carried water to their business premises in containers of 5 to 20 litre capacities. However, this water was not enough for dish washing and food preparation.

Cooking and serving utensils

Food service utensils used by the vendors were made from plastic, metal, enamel or were disposable polythene bags. Methods of washing utensils were observed and Figure 4 shows different methods vendors used to clean utensils in Kayole and Dandora estates. They washed with warm soapy water, with cold soapy water or with cold water alone. Most of the vendors washed their utensils in cold water (70 % githeri vendors), (100% fruit salad vendors), (72% fish vendors), (55% mandazi vendors) and (66% chips vendors).

The utensils were washed using water in buckets, were rinsed only once and the water was used repeatedly before it was replaced. The water for washing and rinsing the utensils was observed to be dirty.

Figure 4. Methods of washing utensils used by different street food vendors



Personal hygiene of the vendors

Personal hygiene of the vendors was observed. It was found that 81.3% of the vendors did not use aprons, 60% handled food with their bare hands, 87.7% had short nails, which were not polished and 65% had their hair not covered. All the vendors handled money while serving food and only 10% of them had worn jewellery. Table 1 shows how vendors observed various aspects of hygiene.

Table 1 Shows information on aspects of personal hygiene

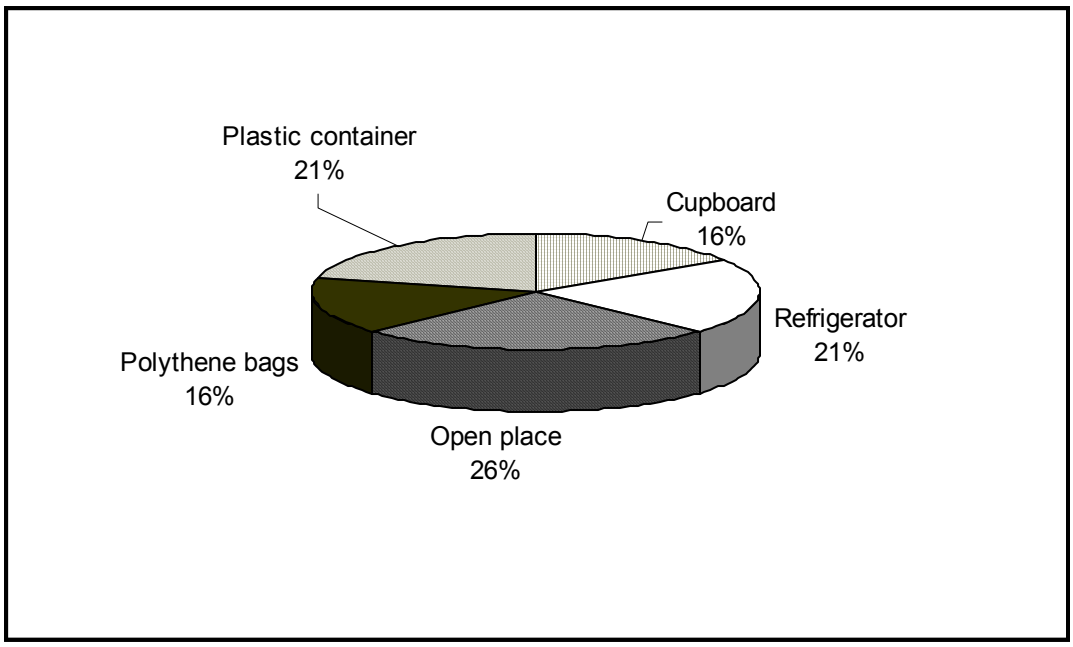
Most of the vendors who sold chips, *mandazi*, *githeri* and fish packed the foods in polythene bags for their customers. When packing these foods, they blew air into the polythene bags to open them so that they could put the food in the polythene bags. Clearly germs, some fairly harmful can be passed on to the consumer through this process.

Methods for packaging and storage of leftovers

Thirty-five per cent of the vendors interviewed said that they usually have left-overs. Out of those, 32.1% reported consuming them and the rest stored them for the following day's

sale. Vendors stored left-over food open place (26%), refrigerator (21%), and plastic containers (21%) while 16% kept them either in polythene bags or in cupboards for sale in the next day. Various methods used by the vendors to package and store the leftovers are shown in Figure 5.

Figure 5. Methods used by vendors to store and contain left-over foods



Most of the vendors stored their left-overs in ambient temperatures; this is quite risky because safety from contamination by pathogenic organisms was not assured and the maintenance of optimal qualities of colour, texture and nutritive value were not put into consideration.

DISCUSSION

Most of the street food vendors neither underwent any form of formal training in food preparation nor did they attempt to seek it. According to FAO [12], food handlers should have the necessary knowledge and skills to enable them to handle food hygienically. Systems should be put in place to ensure that food handlers remain aware of all procedures necessary to maintain the safety and suitability of food. FAO [11]

recommends that every vendor/helper of food should undergo a basic training in food hygiene before licensing.

Water for street food preparation was not enough. This resulted in vendors using little water for washing utensils hence hygiene was compromised. This study is in agreement with a study done in Accra on the safety of street food, which found that running water was not available [13]. Without enough water, hygiene and sanitary practices cannot be met. World Bank [14]asserts that safe water is an essential pillar for health. Latham [1] emphasises that personal hygiene can only be achieved if adequate water is available. Therefore, vendors should have sufficient potable water for drinking, preparation of all kinds of foods and sufficient running water for all washing operations.

Stalls were poorly constructed. They could not give proper protection of the street foods from dust and smoke from vehicles. The same results were formed by the study conducted on street foods in Accra that found that the stands were crude structures [13]. The material used for the construction of the stalls was not able to protect the food from dust, given that all the stalls was built on the roadsides, which were dusty and prone to smoke from cars. Dust carries many microbes that may be pathogenic if left to settle on prepared foods. FAO [15] notes that foods should be prepared in a place set aside exclusively for that purpose, while the place of preparation should be kept clean at all times and should be far from any source of contamination (rubbish, waste waster, dust and animals). Vending stalls should be designed and constructed so that they are easily cleaned and maintained. The Ministry of Local Government should design appropriate food vending stalls.

The vendors observed minimal personal hygiene. Personal hygiene is important because according to Marriot [16], human beings are the largest contamination sources of food. Vendors did not wear aprons or caps, and they handled food with bare hands. Cooked street food should not be handled with bare hands. According to revised guidelines for the design of control measures for street-vended foods in Africa [11], clean tongs, forks, spoons or disposable gloves should be used when handling, serving or selling food. Handling with bare hands may result in cross contamination, hence introduction of microbes on safe food. The person handling money should not handle food. This is because money is dirty and can contaminate safe food [7]. Observing personal hygiene is vital for any food establishment. Any food handler who observes other forms of hygiene but not personal hygiene, will definitely contaminate food. Training should, therefore, be conducted for the street food vendors on various aspects of personal hygiene.

Cooked food and utensils were not covered, which could result in food contamination due to dust and microbes. The utensils in which the food is displayed for sale must be kept clean, covered and protected as they easily become contaminated if left dirty or unprotected [15]. Kinton and Ceserani [17] recommend that foodstuffs of all kinds should be kept covered as much as possible to prevent contamination from dust and flies.

Proper methods of storing left-over food were not used; hence this could promote the sale of stale food. At an international conference on nutrition [18] it was resolved that if food

cannot be served immediately, it should be kept hot or cooled down rapidly and reheated completely to a temperature of at least 70^0 C before eating. This is to make sure that microbes will not thrive on the food because there they flourish well between 10^0Cand 60^0C. It is recommended that the street food vendors prepare enough food for the day, so that they can sell all the food since most of them do not have good storage facilities.

The street foods were prepared in unhygienic and sanitary conditions. This is because the vendors deposited their food and water wastes beside the stalls; this resulted in a dirty environment that attracted houseflies, the presence of which compromise sanitation. Presence of flies is an indication of poor hygiene and sanitary practices. This concurs with another study done in Nairobi, which found that, proper garbage collection and disposal were lacking and vendors had to put garbage in their own place. According to FAO [11] adequate drainage and waste disposal systems and facilities should be provided in the street food industry and designed properly so that the risk of contamination of food and potable water is low.

CONCLUSION AND RECOMMENDATION

Street food vendors practiced minimal hygienic and sanitary practices. The hygienic practices in question included food preparation, handling of utensils; place for food preparation, personal hygiene and methods of storing cooked food. Due to lack of proper knowledge and guidance on street food vending, vendors prepared their foods in explicitly unhygienic and sanitary conditions.

This paper recommends that every vendor, helper or food handler should undergo a basic training in food hygiene. This is to ensure that they follow the required rules for proper hygiene and sanitation.

The government should invest in street food industry as it provides employment, cheap food, and wide variety of foods for the urban dwellers. Through the ministries of Health and Local government, legislation should be developed to recognise the street food industry by developing code of practice for street food vending.

The Local Government ministry should consider establishment of street food centres with adequate facilities and utility services. Such centres will provide an environment for storing, preparing and serving safe food. They will provide the necessary utilities such as potable water, adequate light, and drainage and solid/water disposal, provide conducive environment for consumers to be served with safe food and provide good setting for the relevant authorities to conduct information, education and training programmes for vendors and consumers.

GLOSSARY

1. Jua kali: Blue-collar jobs/manual/unskilled work
2. Jiko: Charcoal cooker
3. Githeri: Meal made of boiled mixed maize and beans
4. Chapati: A flat thin cake of unleavened wheat bread.
5. Mandazi: A deep-fried leavened wheat bread.
6. Mutura: Large intestines of a cow filled with small pieces of meat commonly referred to as African sausage
7. Chips: French fries
8. Sufuria: cooking pot

TABLES

Table 1

Various aspects of personal hygiene

	N(%)
Hair	
Covered	28(35)
Not covered	52(65)
Apron	
Used	15(18.8)
Not used	65(81.2)
Jewellery	
Worn	8(10)
Not worn	72(90)
Fingernails	
Short and polished	7(8.8)
Short and not polished	70(87.4)
Long and polished	3(3.8)

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